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November 24, 1951

SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE

New Nobelists

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BIOCHEMISTRY

New Vitamin Discovered

➤ EXISTENCE OF a new vitamin which may become known as the relaxing vitamin or even as an anti-cancer vitamin is revealed in a report by Drs. Gladys A. Emerson and Karl Folkers of the Merck Institute for Therapeutic Research, Rahway, N. J.

The vitamin has the chemical name, lyxoflavin. It is a member of the B vitamin family. Its existence in human heart muscle was reported in the Archives of the Institute of Cardiology in Mexico in 1947.

Lyxoflavin stimulates growth and weight gain in rats, tests at the Merck Institute show. Although closely related chemically to vitamin B-2, it apparently is not identical with any known vitamin.

Human patients with high blood pressure reported feeling more relaxed when they were given this vitamin, although blood pressure measurements showed no change. Since there was also no change in temperature, pulse, breathing, urine or blood, the vitamin is safe for trial in a number of diseases. These tests were conducted by Dr. Tom Spies, director of the Nutrition Clinic at Hillman Hospital, Birmingham, Ala.

The hint of a possible anti-cancer action of the new vitamin comes from the suggestion of the Merck chemists that the new vitamin may be the chemical which takes part in the checking of cancer transplants in mice reported for another chemical, 6,7 - dichloro-9-(1-D-sorbityl) - isoalloxazine. In fact, research which led to an improved method for synthesizing lyxoflavin was undertaken by Dr. Folkers and associates in order to get more of the chemical for tests of its effect in checking this transplanted mouse cancer.

Details on the vitamin are in the JOURNAL OF THE AMERICAN CHEMICAL SOCIETY (Nov.).

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BIOCHEMISTRY

Aid In Blood Disorder

➤ A B-COMPLEX vitamin called the citrovorum factor, which may provide a better understanding of blood diseases and become a valuable agent in their treatment, has been isolated by Drs. John C. Keresztesy and Milton Silverman of the U. S. National Institute of Arthritis and Metabolic Diseases.

The vitamin, discovered several years ago, is closely related to the vitamin folic acid, which has been used successfully in the treatment of anemia and malnutrition. The new factor gets its name from the fact that it is essential to the growth of the laboratory organism *Leuconostoc citrovorum*.

Drs. Keresztesy and Silverman obtained the material as a pure crystalline salt from horse liver by a process described in the JOURNAL OF THE AMERICAN CHEMICAL SOCIETY (Nov.). Although the pure vitamin has not been tried in man or against human disease, laboratory tests have shown it to be more active than either folic acid or the derivatives of folic acid which formerly were thought to be the citrovorum factor.

Folic acid probably does not exist in nature, the chemists said, except as a part of the citrovorum factor, from which it is removed by chemical treatment.

The synthetic derivatives have been employed in the treatment of leukemia, but they have serious toxic effects which put strict limitations on their use, according to the chemists. It has been shown, however, that the newly isolated material is distinctly different from the synthetic "citrovorum factor" and twice as active.

Furthermore, this vitamin may have therapeutic value in preventing the toxic effects of the folic acid derivatives, the researchers asserted.

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BIOCHEMISTRY

Man-Made Blood Chemical

➤ A BLOOD chemical twice as powerful as adrenalin for fighting shock has now been made synthetically in the laboratory.

The chemical is called serotonin. Successful synthesis of it is announced by Drs. Merrill E. Speeter, Richard V. Heinzelmann and David L. Weisblat of the Upjohn Company in the JOURNAL OF THE AMERICAN CHEMICAL SOCIETY (Nov.).

Crystals of serotonin were isolated from blood platelets in 1948 by Dr. Maurice M. Rapport, now with Sloan Kettering Institute, New York. At that time SCIENCE SERVICE reported that scientists hoped to get enough of the crystals to test the chemical as a remedy for shock and for patients with some kinds of heart disease. But in 1948 Dr. Rapport and associates got only a pinch of the serotonin crystals from a very large quantity of blood.

The chemical acts to constrict small blood vessels and therefore is believed to have a blood-pressure-raising effect. Now that it can be made synthetically, scientists are finding new possibilities for it. Blood loss from wounds in experimental animals, such as laboratory rats, is markedly reduced when the animals are given serotonin. This is true even when the wounded animals have been given heparin, the anti-blood clotting agent which usually causes small wounds to bleed profusely.

It may be useful as a nasal decongestant, as a counter measure for overdoses of anticoagulants such as heparin and dicumarol, in treatment of the bleeding disease, hemophilia, and in some kinds of surgery such as brain operations where it is essential to keep a dry field free from the bleeding from many tiny blood vessels. All these possibilities will be investigated by the Upjohn scientists.

Chemically, serotonin is 5-hydroxytryptamine.

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INVENTION

Ice Will Not Stick To Treated Surfaces

➤ ICE WILL not stick to surfaces of glass, plastics, metals and ceramics if the surfaces are treated with a silicon-containing composition which brought patent 2,575,141 to Robert Smith-Johannsen of Schenectady, N. Y. General Electric has acquired the patent rights. One particular use is the treatment of ice cube trays so that the ice can be removed with ease. It is a method of treatment claimed to be superior to earlier processes. Important feature is the use of a siliceous primer over which is added a siloxane. The latter is a compound well known to chemists, called polyorganohalogenopolysiloxane.

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VITAL STATISTICS

Too Many Old People Dying; Accidents Blamed

➤ TOO MANY old people are dying.

Our mortality rate for persons over 45, each year, is higher than that of most other countries with comparable health situations.

In 1948 in this country, for instance, the death rate for males over 45 was 3,127 per 100,000, while in Norway the death rate was only 2,372 per 100,000. So far as women are concerned, we do better, with a death rate below that of England and France, among other nations.

One of the causes of the high death rate, according to the Metropolitan Life Insurance Company, is the particularly bad accident record. But far more important, is the effect of the high mortality from the cardiovascular-renal diseases, which account for three-fifths of all deaths after age 45 in our country.

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GENERAL SCIENCE

Nobel Prize Winners

Plutonium and five other elements as well as over 100 isotopes discovered by U. S. Nobelists in Chemistry. Physicists' award is for early atom-smashing work.

See Front Cover

➤ NEVER AGAIN in the history of science will it be possible to discover through their creation a half dozen major chemical elements as well as over 100 isotopes or varieties of other chemical elements.

This is the imposing record of the two scientists of University of California's Radiation Laboratory who have been awarded this year's Nobel Prize for Chemistry.

These two scientists have between them shared in the discovery of elements 93, 94, 95, 96, 97 and 98, the most important of which is plutonium number 94. They are Dr. Glenn T. Seaborg, professor of chemistry, and Dr. Edwin M. McMillan, professor of physics.

Before the dawn of the transuranium era of science for which Drs. Seaborg and McMillan are largely responsible, there were only 92 elements known. The heaviest of them was uranium which is the essential material for atomic bombs because the modern A-bomb's plutonium is made from it.

Shown on the cover of this week's SCIENCE NEWS LETTER are Drs. Seaborg and McMillan. Back of Dr. Seaborg (left) is a periodic table while in front of him is the essential apparatus he uses for separation of new elements. On the right Dr. McMillan is shown at the control panel of the University's 300-million-electron volt synchrotron.

In 1940 Dr. McMillan with P. H. Abelson discovered neptunium, element 93, and then Seaborg with associates carried out extensive researches which resulted, also in 1940, in the discovery of the new element plutonium, element 94.

A year earlier, German experiments had shown that bombardments of uranium with slow neutron atomic particles split the atoms and converted mass into energy. This was the famous fission process of nuclear energy basic to the atomic bomb.

One variety of plutonium, the 239 isotope, was identified as being fissionable like the 235 isotope of uranium. Although only microscopic amounts of this plutonium were created in the University of California 60-inch cyclotron, it became an alternate material to the rare natural isotope of uranium 235 as the material of the projected atomic bomb.

Dr. Seaborg headed an intensive top-secret wartime project to study and produce plutonium, working with a large staff at the Metallurgical Laboratory in Chicago. So successful was the project that although the full scale plutonium effort did not begin until 1942, a plutonium bomb was dropped in actual warfare in 1945.

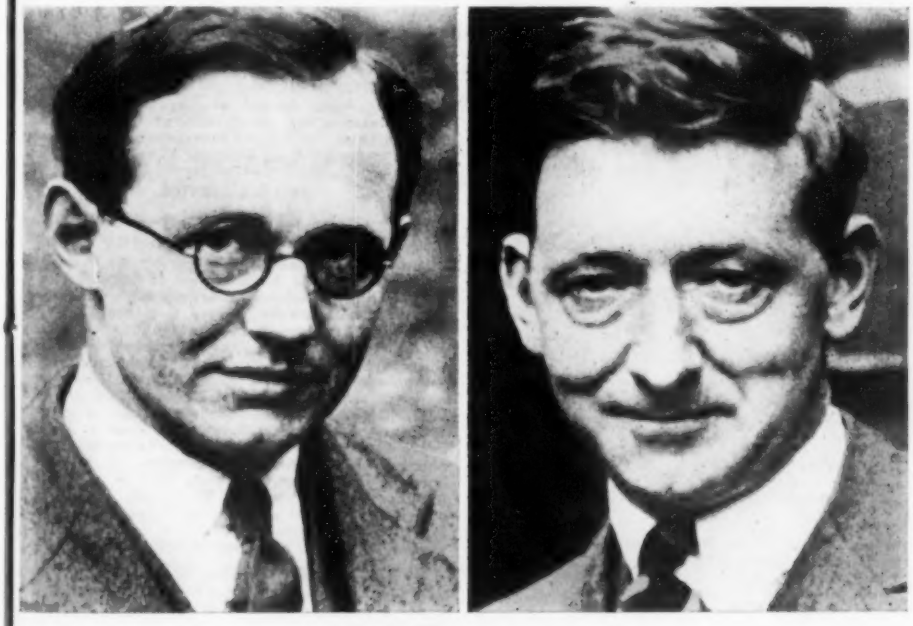
Dr. Seaborg and his associates discovered two other elements, number 95 or americium, and number 96, curium, during the war period. In postwar research, element 97, berkelium, and element 98, californium, were added to the periodic table, both created in the 60-inch cyclotron.

After his work on neptunium, Dr. McMillan worked on the early stages of radar and sonar devices for the war. But in 1942 he went to Los Alamos to participate in the development of the atomic bomb. Dr. McMillan developed the theory of the synchrotron type of atom smasher which carried on the cyclotron pioneering which won for the University of California's Dr. Ernest O. Lawrence the Nobel prize.

Dr. McMillan's synchrotron principle locks the atomic particles in the atom-smashers in such a way that under electromagnetic influence they are coaxed to higher and higher energies. It is applied to the giant accelerators now being built, some of which will rival nature's cosmic ray power.

This idea of Dr. McMillan's was independently discovered by a Russian physicist, V. Veksler, but since his publication in 1945 no word of any practical use in Russia has come through the iron curtain.

The Radiation Laboratory at Berkeley is still producing results, but many of them are being accumulated in secret files deemed to be of prime military importance.



NOBEL PHYSICISTS—Dr. Ernest T. S. Walton (left) of Dublin's Trinity College and Sir John D. Cockcroft (right), director of Britain's atomic energy establishment, share the Nobel Prize for Physics for their pioneering work in atom-smashing.

Transmutation of Atoms

Atomic transmutations, commonplace now, had their beginnings more than a decade before the first atom bomb was set off. Key roles in this early work which ushered in the Atomic Age were played by the two British scientists who share the 1951 Nobel Prize for Physics.

They are Sir John D. Cockcroft, since 1946 director of England's Atomic Energy Establishment, and Dr. Ernest T. S. Walton, now at Trinity College, Dublin, Ireland.

In 1932, these two collaborated, at Cambridge University's famous Cavendish Laboratory, in producing the first successful high-voltage atom-smashing machine. Their feat was the more remarkable because of the relatively low voltage used, about 600,000 volts compared to billion-volt ranges now used.

With this 600,000-volt potential, they shot swiftly moving protons, hearts of the hydrogen atom, at a lithium target. A lithium atom that was struck by a fast proton, captured the hydrogen particle, then

split into two alpha particles, which are the hearts of helium atoms. A large amount of mass was thus transformed into energy, and on a much more vast scale, this is what happens when an atomic bomb explodes.

The energy given off by the capture-and-splitting process was several hundred times as much as that possessed by the proton whose smashing brought about the reaction. But still, for every atom disintegrated, several millions of particles were required.

When boron was attacked by a stream of protons, some 25 times the number of helium atomic hearts were found as when lithium was bombarded. The same technique was used that the two scientists had successfully applied to transmuting lithium into helium with release of energy.

Also by bombardment with hydrogen, fluorine was broken up into oxygen and helium, and beryllium was changed into lithium and helium.

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INVENTION

Water-Tight Case Makes Any Camera Usable Under Water

➤ ORDINARY CAMERAS for still and motion pictures can be used under water with a fluid-tight and gas-tight case which has been awarded a patent. Being gas-tight, it can be used in scientific work in atmospheres containing gases that would be injurious to the photographic film if they got inside the camera.

The case is made of material resistant to corrosion by water or gases, and has openings through which the focusing scales of the camera may be viewed and through which pictures may be taken. Patent 2,573,885 was awarded on this invention to Dudley A. Whitman, Miami Beach, and William F. Whitman, Dade, Fla.

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MEDICINE

Ulcer Personalities

➤ THE "ULCER PERSONALITY" may be the result rather than the cause of stomach ulcers, Dr. T. D. Kellock of Central Middlesex Hospital in London believes.

His opinion, which is contrary to that of most modern doctors who have studied the problem, is based on a study of 250 men with ulcer of the duodenum. This is the upper part of the small intestine close to its junction with the stomach and is very commonly the place attacked by ulcer.

The ulcer personality is usually considered that of a hard-working, energetic, successful person who unconsciously is dependent emotionally and wants to be taken care of.

Since personality is formed during childhood, the man or woman who develops an ulcer personality must have had a different childhood from persons who do not get ulcers, Dr. Kellock reasoned. So he investigated the childhood situation of the 250 ulcer patients and compared that with the childhood situation of 164 patients suffering from other diseases.

He found no difference between the two groups in the size, composition or social class of the family into which they were born, in their educational standard at school or in illness in childhood. There did not seem to be any more or less cases of broken homes, with and without step-parents, among the ulcer patients than among the non-ulcer patients.

It may be that other childhood features might have been different between the two groups, Dr. Kellock states. Or factors operating in late teens or early twenties may be responsible for the characteristics said to be shown by ulcer patients.

"However," he states, "unless further investigations show some clear-cut differences between duodenal ulcer patients and the general population regarding factors operating before the appearance of symptoms, the possibility that the ulcer personality may be the effect rather than the cause of the disease must be considered."

Dr. Kellock's findings are reported in detail in the BRITISH MEDICAL JOURNAL (Nov. 10).

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ARCHAEOLOGY

Earliest Skeleton Found

Hotu Cave in northeastern Iran yields bones that may prove to be the most complete remains of modern man yet found. Dating by radiocarbon calendar attempted.

➤ DISCOVERY OF skeletons of what may prove to be the earliest, most complete remains of modern man in southwestern Asia, was reported to the American Philosophical Society meeting in Philadelphia.

The find was made in Hotu Cave in northeastern Iran by members of the University Museum Iranian Expedition of the University of Pennsylvania and was reported by Prof. Carleton S. Coon and Louis B. Dupree of the University Museum and Dr. John Lawrence Angel of Jefferson Medical School.

No one yet knows just how long ago the bones of the three Old Stone Age Iranians were laid to rest. Specimens have been submitted for dating by the radiocarbon calendar, but this may not be successful. This method works only for material under 25,000 years old; the skeletons, it is estimated, may have an antiquity of anywhere between 15,000 and 75,000 years.

Although these Iranians lived so long ago and had extremely massive brains, they were not chinless like the Neanderthal predecessor of modern man and had no other Neanderthal traits. They were definitely Homo sapiens, Dr. Angel told the meeting.

They are more like Cro-Magnon Europeans than like the Iranians who followed them in the Iron Age.

Even so long ago, the Iranians suffered from very modern aches and pains. One of the skeletons was of a woman who had arthritis. They must have had a good deal of toothache because all had abscessed upper first molars.

Evidence of three distinct cultures was found in Hotu Cave. Near the surface were remains of the Iron Age with some bronze. This layer dates back to 2,000 or 2,500 B.C. Digging down through about 12 feet of this material, the scientists came to a New Stone Age level with very interesting pottery. The designs indicate that the style of pottery originated at this site as did also a style known to archaeologists as Sialk II, found elsewhere in Iran.

In the lowest level, thousands of flints and flakes and flake tools were discovered. Blades and blade tools were much fewer in number and were of poor quality. This does not necessarily mean that the ancient craftsman lacked skill; the flint they had was of such poor quality that it was impossible to make a good blade with such tools.

In the upper New Stone Age level better flint had been brought in from some other region by the beginning of trade and the quality of the blades found had greatly improved.

The new finds stress the fact that the evolution of modern man did not proceed at an even rate and order in all parts of the world and that there was a mixture of races even in the earliest days of Homo sapiens' existence.

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ASTRONOMY

Giant Planet Jupiter Now Has Twelve Moons

➤ THE GIANT planet Jupiter seems definitely to have 12 moons. The faint object discovered late in September by Dr. Seth B. Nicholson of the Mount Wilson and Palomar Observatories is now believed to be a new satellite.

When first announced, astronomers thought the 19th magnitude object found on plates taken with the 100-inch Hooker telescope might be one of Jupiter's other satellites. Repeated photographs of this new object and a search for the other satellites with which it might be confused, however, indicate it is a new moon.

Jupiter's four large satellites were discovered in 1610 by Galileo Galilei. Now, over 340 years later, Dr. Nicholson appears to have equalled his record by becoming the second person to have discovered four moons for Jupiter. Sir William Herschel was another famous moon-finder, having spotted two satellites for Uranus in 1787 and two for Saturn in 1789.

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HOTU MAN—Skull found in Hotu Cave, part of one of the most complete remains of modern man yet discovered.

MEDICINE

Enzyme Chemical Helps Prevent Adhesions

➤ SUCCESS WITH a medical treatment to prevent painful, life-threatening adhesions of the intestines was reported by Drs. John E. Connolly and Victor Richards of Stanford University School of Medicine at the meeting of the American College of Surgeons in San Francisco.

The medicine used is an enzyme chemical called hyaluronidase. After successful trial on dogs, the Stanford surgeons put a solution of this chemical into the abdomen of 14 patients. The patients had adhesions which were causing intestinal obstruction. The adhesions were freed mechanically before the hyaluronidase solution was applied.

The first 12 patients have not had any symptoms of obstruction in the three to 14 months since the operation and treatment. The last two became obstructed about seven and 30 days after the treatment respectively. In these cases the surgeons think the failure of the treatment to prevent reforming of adhesions was due to having used too little of the enzyme chemical. The work with the dogs had shown that when enough of the chemical was used, it prevented reformation of adhesions in all the animals.

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GENERAL SCIENCE

NSF to Give 400 Study And Research Fellowships

➤ THE NATIONAL Science Foundation plans to award about 400 studying and research fellowships in sums ranging from $1,400 to $3,000 a year. The awards will be made in the mathematical, physical, medical, biological and engineering sciences.

The National Research Council will conduct testing and evaluation of all applicants. Most of the awards will go to those who are about to begin postgraduate study, although some will be given to persons who already have their Ph.D. degrees. Results of any research done by the fellows will be made available to the public without restriction, except in the national interest.

Applications must be made before Jan. 7, 1952, to the Fellowship Office, National Research Council, Washington 25, D. C.

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GENERAL SCIENCE

U.S. Short 130,000 Experts

Three years from now a serious shortage of scientists, engineers, technologists and physicians will face nation, preliminary survey shows.

➤ THREE YEARS from now, in 1954, the nation will be faced with a serious shortage of approximately 130,000 scientists, engineers, technologists and physicians.

This will mean that the U. S. Army will have to do without as many combat engineers as it needs, that some vital research into new weapons and new medicines will not be performed and that the creation of new fundamental information will slow down. The Russians will have a better chance to overtake the technological lead upon which we depend for victory if a shooting war comes.

The figure of 130,000 is based on a preliminary evaluation of the Committee on Specialized Personnel of the Office of Defense Mobilization, covering about 22 fields of work. In some of the fields there is no definite information as to either the number now occupied or the need for newcomers. But in almost all the fields covered, it is definitely known that we do not have enough for the defense and progress of the nation. Three years from now, it will be much worse.

The committee is at present asking scientific societies and other interested groups to give it more information so that the needs can be more definitely evaluated.

The preliminary report covers fields of direct interest to national defense in which there are at present 1,314,750 employed. These include the top scientific, technical and engineering brains of the country, the physicians and nurses who will bind up the nation's wounds, the agronomists and the sanitary engineers who will help protect us from biological warfare, the experts in psychological warfare and, of course, the physicists who work on fundamental research from which new benefits for mankind and new weapons for freedom's defense will come.

Most of them are on the critical list of essential occupations drawn up by the Labor Department's Bureau of Labor Statistics.

The report states that the "absolutely and relatively the greatest shortage" is in the field of nursing. By 1954, we will need 404,500 active nurses and we will be 49,200 short of that goal. However, there is a solution. It is in this field that there is the greatest number of inactives. Today there are 322,300 nurses who are active and another 470,000 who are not working as nurses.

The most publicized shortage, and one of the most pressing, is in engineering. There are 400,000 engineers today. The 26,000 who will graduate in 1952 are already being offered relatively fabulous salaries for their services. The Armed Forces will need a great many. In the next three years, 63,000 will graduate. This will be 27,000 less than is necessary to supply the expected demand in 1954.

An added factor in all fields is that the number of graduates each year will be decreasing. On the basis of the present freshman and sophomore classes, graduating classes in 1954 will be about two-fifths the size of 1950's. The end of the G. I. bill benefits and the drafting of youngsters is blamed for this decrease.

Physics is a field in which more information is desperately needed. Figuring on what the committee admits is an inadequate basis, there are said to be about 20,000 physicists. If the ratios from other fields where there is more information hold good, that means we shall be short about 2,000 or 3,000 physicists in 1954.

"There are indications," said the committee, "that the demand for physicists, especially at higher levels of training, is far in excess of the present resources of trained personnel."

Only 358 persons received a Ph.D. in physics in 1950. For advanced research a person is not considered a physicist until he has received his Ph.D. There are, at present, only about 3,000 physicists with the Ph.D degree in the country. Fundamental work of some of the world's great physicists helped make the A-bomb possible.

A similar situation exists in chemistry, where, it is figured, about 85,000 are now employed and we shall be short about 10,000 in 1954.

Congress recently refused to provide federal funds for training more physicians. At the current rate of output of doctors, we shall be 22,000 short. We will need 210,000 physicians and there will be only 188,400 who are active. Similarly we will be 9,200 short of an adequate number of dentists.

The survey does not cover some specialized fields in which specialists will be vitally needed in either a partial or total mobilization. Persons who can speak and translate the languages used in the troubled areas of the world, anthropologists who can provide valuable information on the kinds of people we shall deal with and others in what are called the "humanist" fields are not included. Another survey, conducted by the American Council of Learned Societies, is now attempting to find out how we stand in these fields.

The Defense Department is as interested in these figures as industries and the colleges and universities. Warfare more and more needs highly educated specialists. In addition, the Armed Forces are spending millions for research and development.

Dr. M. H. Trytten, director of the Office of Scientific Manpower of the National Research Council, says that if we do not husband our current supply of scientists, technologists and engineers, we may find some day that we lack just that little bit extra advantage in technological warfare which will mean the difference between victory and defeat.

In addition, he points out, we need to train new scientists, technologists and engineers. We must increase our supply, if we are to maintain our lead over our probable enemy. It is for this reason that he headed a committee of the Selective Service System which designed the present plan for deferment of young men who could do well in college.

The figures in the preliminary survey show that, once they are out of college, they will be in great demand.

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GEOLOGY

Volcanoes and Ocean Make Iron in Michigan

➤ IRON IN upper Michigan was deposited in a setting of an isolated ocean basin surrounded by volcanoes, Dr. H. L. James of the U. S. Geological Survey said in Detroit.

The iron-rich rocks, volcanoes and the great ocean trough of upper Michigan are believed related, he told members of the Geological Society of America meeting.

The lowest rocks found in this trough, he said, are iron-poor and represent material laid down on a shallow ocean shelf. The next group of rocks, resting on this shelf, are iron-rich, while the most recent layer of rocks represent debris from volcanic explosions deposited on top of the iron-rich layer. By comparing the three types of rocks, it is possible to reconstruct the conditions of upper Michigan's scenery over a billion years ago.

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MEDICINE

Volemic New Name For Plasma Substitutes

➤ A NEW name for blood plasma substitutes such as gelatin, dextran and periston or PVP has been coined by Dr. Jesse L. Bollman of the Mayo Clinic, Rochester, Minn.

"Volemic substances" is Dr. Bollman's new word for these chemicals. They are also sometimes called blood or plasma volume expanders because their effect is to expand the volume of fluid in the blood circulation.

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GEOLOGY

Winds Caused Pattern

Winds, not meteors, suggested as cause for regular pattern of Carolina "Bays" after world-wide study of special lake groupings known as oriented lakes.

➤ WINDS, NOT METEORS, caused the regular pattern of the much-disputed Carolina "Bays," or "Pocosons," as well as other groups of lakes found in southwest United States, Alaska and Australia.

This explanation for the puzzling Carolina "Bays" is put forth by Dr. W. Armstrong Price, professor of geological oceanography at the Agricultural and Mechanical College of Texas, after a world-wide study of special lake groupings known as oriented lakes. These are groups of elliptical, or egg-shaped, lakes and lake basins in which the long diameters of most of the basins lie in the same direction.

According to students of meteors, there seems to be no place in the world, Dr. Price reports, where such regularly patterned oval lakes were caused by meteor impact. Celestial bombardment was the explanation first put forth to explain existence of the Carolina "Bays."

The meteor theory, however, does not explain the occurrence or shape of the "Bays" for two main reasons: first, the known meteor craters are said to be round, not elliptical, and second, they all have highly disturbed rim folds, not merely rim ridges—the former being lacking at the "Bays." Moreover, no fragments of meteorites, commonly abundant at true meteor craters, have been found around the "Bays."

Dr. Price believes that the patterned lake groupings originated and got their chief growth when the climate was drier, like that of regions marginal to deserts. These regions are treeless prairies with the upper levels of groundwater lying fairly deep below the ground surface. During long or short periods when these lakes held water, the strong, dry-region winds shaped them into rounded and oval forms by active wave and current erosion, sweeping up the eroded sand into smooth beach ridges.

During some periods when the lakes were dry, winds were strong enough to blow loose sand and silt out of the basins. Percolating rain waters leached the walls and floors, loosening the sediments and making them vulnerable to wind scour. Large deposits of these materials exist in many deep basins, in others have blown completely away. Some lakes are shaped mainly by the wind-transported materials.

The basic cause of the oval shapes is irregularity in the wind circulation, making one axis longer than the other. In many cases the initial elongation was due to the basins originating in parallel, elongated depressions either wind-scoured or between long dune ridges. Thin sheets of dune sand were more widespread at times of drier climates than would be supposed, having been entirely blown away from large areas.

Wind irregularity under a former, drier climatic regime is responsible for the beautiful pattern of the Carolina "Bays" as well as for other oriented lakes, Dr. Price has concluded. Many of these lakes are now changing shape since the wind directions and strengths have changed.

Science News Letter, November 24, 1951

MEDICINE

Red Blood Cells Washed To Show Virus Inside

➤ WHEN RED blood cells are washed by a special process so that only their outer membrane, or covering, remains, certain disease viruses that get inside the blood cells can be seen with electron microscopes, scientists at the Institute of Biological Sciences in Montevideo, Uruguay, find.

The red blood cell washing process, which showed type O virus of hoof and mouth disease inside the cells, was developed by the Argentine professor, Dr. Eduardo de Robertis, Dr. Bernardo Epstein of the Institute of Animal Biology of Montevideo, and Dr. N. M. Fonseca of the Universtiy of Brazil at Rio de Janeiro. Details are reported in the journal SCIENCE AND INVESTIGATION (April).

Science News Letter, November 24, 1951

VIRUS IN CELLS—Red cell membrane showing groups of virus in the form of a ring. The viruses are of hoof and mouth disease.

MEDICINE

Can Find Cancer Five Years Before Symptoms

➤ ONE KIND of cancer in women can be discovered and treatment started five to seven years before typical symptoms appear to send the woman to her doctor, Drs. Rodney B. Nelson and Albert W. Hilberg of the U. S. Public Health Service find.

Their findings were made through examination of more than 3,000 women at a clinic formerly operated by the U. S. National Cancer Institute at Hot Springs, Ark.

The kind of cancer that can be discovered in this very early, preinvasive stage is that which attacks the cervix of the uterus.

In their examinations the two doctors employed the cytologic test and the biopsy. The former is the taking of a smear from the surface of the cervix, while the latter is the taking of a small specimen of tissue. Results of both these tests are disclosed in laboratory examination of the material to determine whether cancer cells are present. The cytologic test is made first and usually indicates whether a biopsy should be made.

"Under the conditions of this study," Drs. Nelson and Hilberg reported, "the combined accuracy of the two techniques in diagnosing carcinoma of the cervix approaches 100%."

Science News Letter, November 24, 1951

AERONAUTICS

Ten Turboprop Engines Give New Flying Boat High Speed

➤ TEN TURBO-PROP engines in the new British giant flying boat, the Princess, will provide a cruising speed of 380 miles an hour. The first of this type of 140-ton craft is now out of the hangar and is being completed on an apron on the water front. It will be ready for flight tests early next year.

The Princess is a product of Saunders-Roe works, Cowes, Isle of Wight. Designed originally for a civil transport, it is now planned to use it to carry troops. The civil version would accommodate 105 passengers. As a troop carrier, its capacity is 200 fully equipped men.

Three of these flying boats are actually under construction. They will be able to make 3,500-mile non-stop flights, which is sufficient for linking strategic seaports between Britain and the East. The engines to be used are Bristol Proteus turbo-props, and the ten will give an aggregate output of 35,000 horsepower.

Science News Letter, November 24, 1951

MEDICINE

Acute Malaria Treated by Drug

➤ A "SUPERIOR" drug for treatment of acute malaria was announced at the meeting of the National Malaria Society in Chicago.

Name of the drug is hydroxychloroquine. It was developed by Drs. E. W. Dennis, F. C. Goble, J. O. Hoppe, J. P. McAuliff and E. W. McChesney of Sterling-Winthrop Research Institute, Rensselaer, N. Y.

The drug can be given by mouth or by hypodermic injections. When fed to White Pekin ducklings infected with malaria, it showed anti-malarial activity equal to that of chloroquine. But in ducks and also in rats and dogs, the scientists found, the new drug can be safely given in much larger doses than chloroquine. It also stays in the blood plasma in higher concentration and for a longer period of time than chloroquine.

These advantages, the scientists stated, suggest that the new drug should be given a trial in treatment of acute malaria in human patients and also as a prophylactic suppressive drug for malaria control in regions where men must work and fight where malaria abounds.

Neither antibiotics nor cortisone would be useful in malaria, according to laboratory tests reported by Drs. Edith M. Darrow, Wendell D. Gingmich and Joanna Hull Prine of the University of Texas Medical Branch, Galveston, and Dr. W. B. Redmond of the Veterans Administration Hospital, Chamblee, Ga. Dr. Redmond reported on the cortisone trials, while the University of Texas group reported on the antibiotic trials.

Science News Letter, November 24, 1951

MEDICINE

Do Not Take Chance On Appendicitis

➤ APPENDICITIS IS not the killer it once was, but the disease is still common and the complication of peritonitis from a ruptured appendix is still dangerous, even with sulfa drugs and penicillin to fight it.

The appendix is a small, apparently useless organ jutting out from the beginning of the large intestine. Normally it is located in the lower right forward part of the abdomen. Sometimes, however, it may be found nearer the back and in that case appendicitis pain comes in the back instead of the lower abdomen. When the appendix becomes inflamed, due to blocking of the organ by foreign matter or by infection, there is pain and nausea or vomiting.

Because the pain and distress associated with the disease closely resemble the symptoms brought on by constipation, patients sometimes resort to laxatives. Laxatives increase peristalsis, the movement by which the contents of the intestine are moved along. This increased pressure may extend the swelling and cause rupture of the appendix, spreading the infection to the peritoneum, the lining of the abdominal cavity.

The first thing to do is call your physician when severe pain appears in the lower right quadrant of the abdomen, warns the Illinois State Medical Society. Let him decide what the trouble is and what to do about it. Do not take laxatives, cathartics or "physics." Do not apply ice packs or heat to the painful area. Do not rub or massage the abdomen. Do not swallow anything except water until you have consulted a physician.

If your physician decides that an operation is essential, trust him. Ignoring his advice may cost you your life. Once the appendix bursts, the damage caused by spreading infection is more difficult to repair.

Science News Letter, November 24, 1951

NUTRITION

Eat Vitamin C Every Day, Nutritionists Advise

➤ YOUR BODY cannot store much vitamin C, so you must get some every day in your diet, nutritionists advise. This vitamin, known also as ascorbic acid, prevents scurvy and is essential for keeping body tissues in good condition.

Many persons rely on the breakfast fruit juice for their vitamin C ration. If you do this, check your choice because some fruit juices supply more than others. Orange juice and other citric juices, fresh, frozen and canned, rank high in content of this vitamin.

Tomato juice is another good source of vitamin C, though unless fortified with added vitamin C, it takes more than twice as much canned tomato juice to match canned orange juice. Pineapple juice has much less of this vitamin, and only traces —unless the juice is fortified—are to be found in apple, prune, or grape juice, all popular for flavor and variety.

Extra vitamin C is sometimes added to apple juice and other canned, bottled and frozen juices which are short on it. The fortified juices may have as much or more vitamin C as citrus, the nutritionists explain, but be sure and check the label.

If your breakfast juice is short on C, be sure to get this vitamin in some other dish or later in the day. Among other vitamin-C-rich dishes are the fruit itself of citrus and tomatoes which can be served many ways in any meal. Excellent sources of ascorbic acid are strawberries, kale, turnip greens, broccoli, raw cabbage, green peppers and the dark-colored raw salad greens. Good providers are lightly cooked cabbage or collards, cantaloup, sweet potatoes, cauliflower, and spinach.

Science News Letter, November 24, 1951

IN SCIEN

PLANT PHYSIOLOGY

Plants Injure Themselves By Mineral Selection

➤ PLANTS ARE not always so smart. They sometimes commit suicide or injure themselves.

Certain minerals, about 15 of them, are essential for proper plant growth. But often plants take up the wrong ones, Perry R. Stout of the University of California's College of Agriculture in Berkeley finds.

For example, in laboratory experiments it has been shown that strontium which is not essential will be absorbed by plants. Strontium is about the same size as calcium, an essential plant food. If a plant takes up this strontium, it becomes deficient in calcium and cannot grow normally.

Similarly, it has been shown that molybdenum, if present in large amounts, is taken up instead of essential sulfur. Plants need a small amount of molybdenum, but sometimes so much is taken up that it poisons livestock. In low sulfur soils where large amounts of molybdenum are present, enough molybdenum may be taken up by the plant to injure it.

Often two essential minerals such as calcium and magnesium will compete to be taken into a plant. If magnesium is relatively high in proportion to calcium, it usually wins out causing a calcium deficiency. The plant cannot tell the difference until the magnesium gets up into the stem and leaves. Then it is too late.

Science News Letter, November 24, 1951

NUTRITION

Enzymes Give Quality To Evaporated Milk

➤ HIGHER QUALITY evaporated milk is expected as the result of studies now being made in California.

N. P. Tarrassuk of the University of California's College of Agriculture at Davis has found that he can double the viscosity, or thickness, of evaporated milk by changing slightly the structure of the milk protein molecules.

He does this by using proteolytic enzymes. These enzymes, similar to those in our digestive system, are added in small amounts just before the milk is sterilized. Color and flavor are not affected by this change in the molecule.

Previously, excessive heating of the milk was the only way to increase the viscosity. Such treatment, however, produces undesirable flavor and color in the milk.

Science News Letter, November 24, 1951

ENE FIELDS

ACOUSTICS

Musical Scale Analysis Helps Modern Composing

➤ CHARTING THE relationship of notes and tones in the musical scale used since before the time of Bach may bring order out of the chaos into which some modern composers have fallen.

This is the theory of Dr. Howard Hanson, himself a modern composer. Speaking at a meeting of the American Philosophical Society in Philadelphia, Dr. Hanson, director of the Eastman School of Music, Rochester, said he believes that with the development of modern music, "as much new material has been added to the composer's tonal vocabulary in the last 75 years as had been added in the previous 300.

"The young composer, swept from the safe moorings of tonality, all too frequently flounders about in this vast sea of new material with the result that his music may sound both inconsistent and chaotic."

Dr. Hanson attempts to set up a complete analysis of all tonal material possible in the present system of tuning. No so-called "anarchist" in modern music, Dr. Hanson sticks to the scale used by Bach and Beethoven and practiced by every young piano student.

With the consideration of six basic relationships of tone, within this scale, he institutes a kind of "chemical" analysis and presents a chart of all the possible sounds and indicates their inter-relationship.

Science News Letter, November 24, 1951

EDUCATION

Teachers Should Teach Children, Not Courses

➤ "TEACHERS SHOULD teach children, not courses," declares Dr. Florence Clothier, child psychiatrist of Harvard Medical School, in a report to the National Association for Mental Health.

Dr. Clothier sees the teacher more as a personality-builder than as a knowledge giver. She says that the teacher's own maturity and emotional adjustment are a strong influence in the child's development as a mentally healthy individual.

The child's personality grows by a process of "identification,"—that is, by the child trying to be like the adults who are important to him, Dr. Clothier explains. His attitudes toward life and other people are shaped by these identifications. The teacher, like the parent, will therefore have a great impact on the formation of these attitudes.

"Wholesome teacher personality is particularly pertinent in our public schools. In many, many cases, it is here that children have their only chance of establishing wholesome personality-building identifications."

Dr. Clothier criticizes the imparting of knowledge without any relation to the child's personality growth.

"Our greatest educational blunders, blunders that in many cases have produced psychic injury, have consisted in forced feeding of meaningless material. The enlightened teacher does not focus primarily on the transmission of facts or skills, but on what those facts and skills can contribute to the whole personality development," she believes.

Education should help the child to discover "useful work suited to his capacities," so he can get satisfaction out of the performance of these tasks, and from this, the self esteem essential to good mental health.

Science News Letter, November 24, 1951

METEOROLOGY

Colder Than Normal for Most of Nation Forecast

➤ "MOST OF the nation" can expect colder than normal weather until the middle of next month with the "most unseasonably cold weather" hitting the lower Great Lakes region and the central Mississippi and Ohio valleys.

This is the prediction of the Weather Bureau's Extended Forecast Section for the period up to mid-December. Only New England, the southwest and Florida can expect normal or above normal temperatures.

East of the Mississippi it will be a snowy month, too, except in southern regions where, of course, it rains. Rain and snow in the east are expected to exceed normal. There will be considerable snow over the central and northern inland regions of the east. Elsewhere there will be about the usual or less than usual amounts of snow or rain.

Science News Letter, November 24, 1951

WILDLIFE

Audubon Society Award To Oil and Gas Companies

➤ HELPING TO preserve from extinction America's 32 remaining whooping cranes has won for the Continental Oil and Western Natural Gas companies a citation of merit from the National Audubon Society. The companies had planned to place a loading dock on the edge of the whooping cranes' winter nesting place, but changed their plans in order to keep from disturbing the birds. The U. S. Fish and Wildlife Service and the Audubon Society are cooperating in a program to save the whooping cranes from extinction.

Science News Letter, November 24, 1951

NATURAL RESOURCES

Uranium Will Be "Mined" From Fertilizer

➤ THE FERTILIZER industry can make an "important and continuing contribution to our domestic supply of uranium," an Atomic Energy Commisison official said.

For many years farmers have been spreading on their fields fertilizers made from phosphate rocks. These fertilizers contain small amounts of uranium, which neither help nor harm plants, tests have shown. Now the AEC is proposing to recover this uranium, add it to our stockpile of the valuable raw material.

The first production plant to recover uranium from phosphoric acid is now under construction by the Blockson Chemical Company at Joliet, Ill., Sheldon P. Wimpfen of the raw materials division told members of the National Fertilizer Association meeting in Atlanta, Ga.

Although the amount of uranium per ton of phosphate rock is very small, he said, so many millions of tons are mined annually for fertilizer that this source of uranium has been thoroughly investigated by the AEC. Two processes look most promising for recovering the uranium: from wet-process phosphoric acid and from solutions made in the course of manufacturing phosphate fertilizers by acidulation with nitric acid.

Science News Letter, November 24, 1951

INVENTION

Glass Beads in Paint Make Highway Lines Easier to See

➤ PAINTED LINES on the highway as an aid to traffic are more easily seen, particularly at night, with a special paint containing glass beads on which a patent has been issued.

The paint containing the tiny beads can be applied in a single operation by brush or spray, using hand methods or the road-striping equipment now widely employed.

The inventor is Harry Heltzer, St. Paul, Minn. His award was patent 2,574,971. Rights are assigned to Minnesota Mining and Manufacturing Company of the same city. It is called a reflective paint because it contains brilliantly reflective pigment as well as the tiny transparent glass beads.

Glass beads have been applied to highway painted lines in the past but they have been applied after the lines were painted and before the paint was dry. This paint has a varnish base and contains titanium oxide, which acts as a brilliant white reflective material, and asbestine which is a paint-making grade of talc and is chemically a magnesium silicate.

When the paint is first applied the glass beads are buried in it, but wearing action of passing vehicles soon exposes their upper surface so that they reflect light.

Science News Letter, November 24, 1951

ASTRONOMY

Brightest Night-Time Star

Along with an unusually brilliant planet, Jupiter, you can see brightest star, Sirius, in southern sky on December evenings.

By JAMES STOKLEY

➤ THE BRIGHTEST star of the night-time sky appears along with an unusually brilliant planet in the evenings of December.

Toward the southwest in the constellation of Pisces, the fishes, shines the planet Jupiter. With magnitude minus 2.1 on the astronomical scale, it considerably exceeds any rival object, except for the moon.

The star, which is about two-thirds as bright, is Sirius, in the constellation of Canis Major, the great dog, and it stands low in the southeast. Because of its low altitude, it does not shine as brightly as it will later in the night when it has risen higher in the southern sky, though its brilliance leaves one with no doubt as to its identity.

Both Jupiter and Sirius are shown in the accompanying maps, which depict the appearance of the skies about 10:00 p.m. your own kind of standard time, at the beginning of December, an hour earlier at the middle of the month and two hours earlier at the end.

Vega Is Next Brightest

After Sirius, the next star in order of brightness, of those now visible, is Vega, in Lyra, the lyre, but this is very close to the horizon in the northwest and only equals a star of the second magnitude.

However, directly above Sirius, we can see the assemblage of bright stars that make the skies of winter so brilliant. The brightest of these is Rigel in the figure of Orion, the warrior, and to the right of the row of three stars that mark his belt.

Above and to the left of the belt is the next, Betelgeuse, part of the same constellation. Still higher than Orion in Taurus, the bull, is Aldebaran, next in brightness.

About as high as Betelgeuse and farther to the left (so that it is shown on the map of the northern sky) we find Gemini, the twins, in which there are two rather bright stars, Castor and Pollux. Only the latter, however, is classed as first magnitude. This is the lower of the pair.

Below Gemini is Canis Minor, the lesser dog, with the star called Procyon. Going upwards from Gemini we come to Auriga, the charioteer, with Capella.

Finally, the last of the first magnitude stars that are shown is low in the northwest —Deneb, in Cygnus the swan. This group is above Vega and, as with that star, the atmospheric absorption on account of its low altitude makes Deneb appear considerably fainter than the first magnitude star that it is.

The other planets to be seen on December nights do not come up until after midnight. Soon after that hour in the constellation of Virgo, the virgin, Saturn rises, of magnitude 1.0. Nearby is Mars, slightly fainter. At the start of the month Mars is to the west, but it is moving eastward. On Dec. 19 at 8:00 a.m. EST, when the planets are not visible because of the daylight, Mars passes about a third more than the moon's diameter to the south of Saturn.

Venus Rises in Early Morning

About 3:15 a.m. at the beginning of December, Venus rises in the southeast. By the time that it gets as high, it shines nearly five times more brilliantly than Jupiter. Finally, at the very end of the month, it should be possible to get a glimpse of Mercury very low in the southeast a short time before the sun rises.

At the middle of December, Jupiter is about 431,800,000 miles from earth, approximately four and two-thirds the distance of the sun. Because Jupiter is so big, being the largest of the planets, it has a lot of surface to reflect sunlight to us and this makes it look so bright. Also it has a high "albedo," i. e., Jupiter reflects more than half of the light that falls upon it. Seen from out in space, the earth would reflect only about 29%.

The position of Jupiter in December helps us find one of the important points in the sky, the vernal equinox, which is where the sun stands at the beginning of the spring season. It is just a little below and to the right of Jupiter at present.

The importance of the vernal equinox is in the fact that it is the point from which astronomers measure right ascension, which corresponds to longitude on the earth and is one of the two principal coordinates of the sky.

Declination Corresponds to Latitude

Corresponding to latitude is declination which, like its terrestrial counterpart, is measured from the equator. By this, of course, is meant the celestial equator which passes through the sky directly over the equator of the earth.

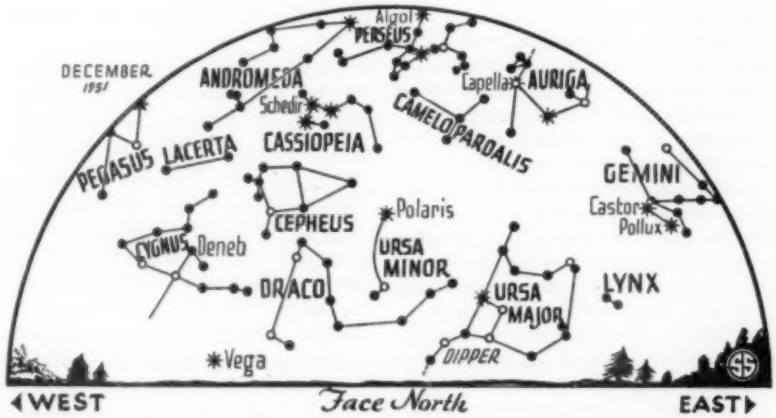
On earth we measure longitude from the meridian which passes through Greenwich, the former site of the British Royal Observatory. The vernal equinox performs a similar function in the sky, but there is one important difference. Longitude is measured in degrees, minutes and seconds, east or west of Greenwich.

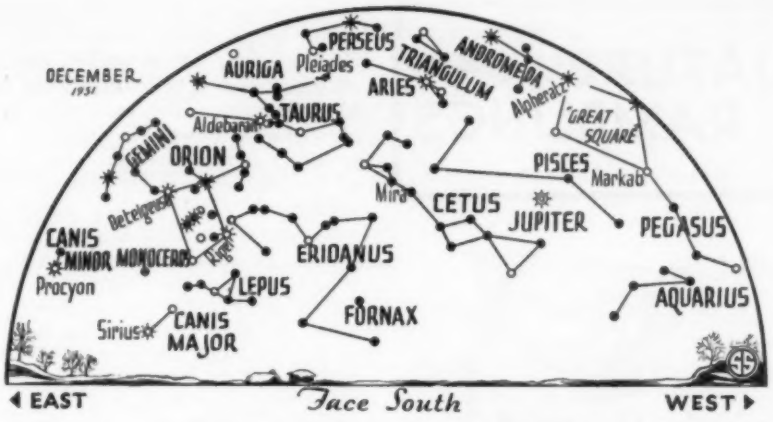
Right ascension is measured in hours, minutes and seconds, completely around the sky. There are 24 hours in the complete circle, so one hour equals 15 degrees. Similarly, minutes and seconds of time, as thus used to measure sky distances, are 15 times as big as the minutes and seconds of arc.

Vernal Equinox Changes

Another name for the vernal equinox is the "first point of Aries." High in the southern sky, as shown on the map, is the figure of Aries, the ram. At the right-hand end of the figure are three stars forming a little triangle. These have the typical Arabic names of Hamal, Sheratan and Mesarthim.

There was a time, many thousands of years ago, when the vernal equinox stood in the constellation of Aries, instead of Pisces, the fishes, where we see it today.





But owing to a slow movement of the skies, called "precession," which takes nearly 26,000 years to complete, the equinox slips around the heavens toward the west. However, the name "first point of Aries," was given when it really was in that group, and has been retained in spite of the fact that this is no longer true.

This, incidentally, is one of the reasons why astronomers completely reject the claims of the astrologers that the position of a planet in the sky exerts some mysterious influence upon the earth, particularly upon people born at the time. What the astrologers use are the "signs," which are the places where the constellations used to be, not the positions where they are at present.

Surely if there were any influence of the planets, depending on what distant background of stars they happened to stand against, it would be reasonable to suppose that it would be the stars actually in the background and not those that would have been there many thousands of years ago.

Celestial Time Table for December

Dec.	EST	
5	11:20 a. m.	Moon in first quarter
7	5:26 a. m.	Moon passes Jupiter
	11:35 p. m.	Algol (variable star in Perseus) at minimum
10	8:24 p. m.	Algol at minimum
12	early a. m.	Meteors visible radiating from constellation of Gemini
13	4:30 a. m.	Full moon
	5:13 p. m.	Algol at minimum
15	10:00 p. m.	Moon farthest, distance 252,400 miles
16	10:00 p. m.	Mercury between earth and sun
19	8:00 a. m.	Mars passes Saturn
21	9:37 a. m.	Moon in last quarter
22	11:01 a. m.	Sun farthest south, winter commences
	6:27 p. m.	Moon passes Saturn
	9:37 p. m.	Moon passes Mars
25	8:48 a. m.	Moon passes Venus
28	6:43 a. m.	New moon
	6:00 p. m.	Moon nearest, distance 221,900 miles
30	10:08 p. m.	Algol at minimum

Subtract one hour for CST, two hours for MST, and three for PST.

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MEDICINE

Debate Milk's Cancer Role

► WHETHER HUMAN breast milk carries a cancer-causing virus, as mouse milk can, is still an unanswered question, it appears from reports at the New York Academy of Sciences conference on viruses as causative agents of cancer.

Numerous sphere-shaped, submicroscopic particles that might be cancer virus were found on electron microscope examination of breast milk from mothers with a record of cancer in some member of the family, Drs. Ludwik Gross and Kenneth S. McCarty of the Veterans Administration Hospital, Bronx, N. Y., and Dr. Albert E. Gessler, of Interchemical Corporation, New York, reported.

Mothers from families apparently free of cancer had these particles in some samples of their milk, but not in almost all as the cancer-family mothers did.

These particles may be normal components of human milk, but "it may well be," the scientists point out, that "some of them, at least," are disease agents, including perhaps a cancer agent.

More of such particles were found in material extracted from breast cancers and from breast milk of women with breast cancer than in milk from apparently healthy women, Drs. L. Dmochowski and R. D. Passey of the University of Leeds, England, reported.

The number of specimens they examined, 38 in all, is too small, the English scientists state, "to permit any final conclusions."

Science News Letter, November 24, 1951

Stimulating Books in the field of

Human Behavior

☐ **Bases of Human Behavior:**
A Biologic Approach to Psychiatry
by Leon J. Saul, M.D.
New, 1951. 150 Pages. $4.00

☐ **Emotional Maturity:**
The Development and Dynamics of Personality
by Leon J. Saul, M.D.
1st Edition, 1947. 339 Pages. $5.00

☐ **Principles and Practice of the Rorschach Personality Test**
by W. Mons, M.R.C.S., L.R.C.P.
2nd Edition, issued in America in 1951.
176 Pages. $4.00

☐ **Handbook of Psychiatry**
by Overholser and Richmond
1st Edition, 1947. 252 Pages. $4.00

☐ **Crime and the Mind**
by Walter Bromberg, M.D.
1st Edition, 1948. 219 Pages. $4.50

☐ **Saints, Sinners and Psychiatry**
by Camilla M. Anderson, M.D.
1st Edition, 1950. 206 Pages. $2.95

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VETERINARY MEDICINE

X-rays Promise Healing Of Race Horse Ills

➤ X-RAY TREATMENT, used experimentally, is giving promising results in several diseases of cattle and race horses at the University of California School of Veterinary Medicine at Davis.

Cancer of the eye, not uncommon among white-faced cattle, apparently has responded to large doses of X-rays. The tumorous growth has not recurred in the two animals treated with the X-rays last spring.

The X-ray treatment has also been used with satisfactory results in early cases of tendonitis and ring bone in race horses. These disease conditions, usually caused by strains, injuries, or unsoundness, make animals lame and unfit for use on the turf.

All the treatments so far have been on an experimental basis, the University of California scientists declare. It is entirely too early to make recommendations of this treatment for these specific diseases.

Science News Letter, November 24, 1951

INVENTION

Dual Purpose Machine Washes Clothes and Dishes

➤ A DUAL PURPOSE machine for the home kitchen which is easily converted from a clothes-washer to a dish-washer brought patent 2,571,438 to Andrew H. Gerhadt, Skokie, and Arthur P. Schultz, Hinsdale, Ill., with rights assigned to the Thor Corporation of Chicago. Separate receptacles are provided for clothes washing and for dish washing but they both are operated by the upright shaft that oscillates in the center of the machine. They are interchangeable.

When used as a clothes-washer, articles to be cleaned are immersed and agitated in a deep body of washing liquid as in ordinary machines. When washing dishes, a different mode of operation is employed. The dishes are subjected to the blast of high velocity jets or streams of washing liquid projected from and drained back to a reservoir.

Science News Letter, November 24, 1951

HEAVY LIQUIDS
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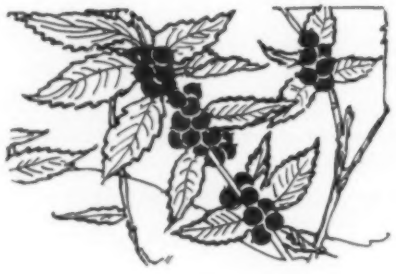
NATURE RAMBLINGS



Winterberry

➤ CHRISTMAS IS already occupying a considerable place in the thoughts of children, and therefore, of necessity, in the activities of those who cater to the Christmas trade.

Even now the gatherers of holly and other Christmas greens are beginning to get their wares together, for in many cases these decorations must be shipped hundreds of miles, which takes a lot of time. Holly grows wild throughout the South, and along the Atlantic seaboard, except for the northern New England states. It can be cultivated inland.

We have become so used to thinking of holly as a mild-climate plant that it surprises us a little to learn of a native American holly that thrives perfectly well in the winter climate of the North, even in the upper Mississippi valley. We do not recognize it as a holly, because it does not have the hard, glossy, prickly leaves of our old familiar Yuletide friend, and because its softer foliage changes color and drops off in late autumn, in orthodox fall-leaf fashion.

But the winterberry is a true holly none the less, as will be recognized in a moment if one examines the round, red, glistening berries with which its slender stems are beset. Botanical name for the holly family is *Aquifoliaceae*, and it includes some 300 species, distributed mostly in Central and South America. There are many kinds found in the U.S., however, and practically all of them belong to the genus Ilex, or true holly.

The winterberry is also known as the black alder, and is closely related to the smooth winterberry found in the swamps from Georgia to Pennsylvania. The winterberry does not reach tree size, as the Christmas holly does—it is never more than a tall and somewhat straggling bush. In Virginia, it sometimes reaches a height of 25 feet, though its ordinary stature averages only about five or ten feet. It is found from Nova Scotia south to Florida, and westward as far as Missouri.

Like most of our other bright-berried shrubs, the winterberry has suffered considerably from the depredations of commercial collectors. Those interested in preserving the beauty of our native woodlands urge private individuals not only to refrain from taking winterberry, but also to refuse to buy it if it is offered on the market.

Science News Letter, November 24, 1951

TECHNOLOGY

Burning Unmined Coal

➤ FOUR YEARS of experimental work gives definite proof that unmined coal can be burned underground in its natural seams and that the gases obtained can be used successfully to operate a gas turbine engine or as fuel to generate steam. The gases may also be used to make synthetic gasoline and fuel oils and to obtain chemicals.

Initial work in this experimental undertaking at Gorgas, Ala. was begun in the spring of 1947. The entire project has been a joint undertaking of the U. S. Bureau of Mines and the Alabama Power Company. Coal seams of the power company were used. The early work was to determine if the coal could be burned in place without mining, and how the burning could best be controlled.

More recent work was concerned with making use of the gases obtained as well as improving burning procedures. Included was the operation of two gas turbine engines.

During the 22 months of the second phase of the project, a total of 10,485 tons of coal, underlying an area of almost two acres, was gasified. Over a four-month period, when 65% of the heating value of the coal was realized, the energy yield was greater than could have been obtained from the coal mineable from the same area under existing mining methods, the Bureau of Mines states. The two gas turbines were successfully operated for approximately 100 hours on the combustible gases obtained.

In burning coal in natural layers under ground, holes are drilled into the coal from the surface and fire started in one. Air or oxygen is forced down this hole to support combustion. The gases of combustion are forced through the coal to the other holes and up to the surface where they are captured. These gases are similar to those obtained in the well-known process of making artificial household gas from coal.

Science News Letter, November 24, 1951

METEOROLOGY

Seeding Not Required

When conditions are right it will rain without seeding, experiments of Signal Corps scientists with cloud chambers show.

➤ EXPERIMENTS CONDUCTED by the Army's Signal Corps Engineering Laboratories show that in most cases where the weather conditions are favorable to rain, it will rain without cloud seeding to produce artificial rain. This is the statement of two Signal Corps scientists, H. J. aufm Kampe and H. K. Weickmann. The Signal Corps has been associated with General Electric Nobel Prize Winner Dr. Irving Langmuir in "Project Cirrus" which conducted early experiments in rain-making. Dr. Langmuir has since claimed that cloud seeding has produced changes in the weather over areas equal to half the United States.

The two Signal Corps scientists experimented in a cloud chamber to determine the temperatures at which both natural and artificial cloud "seeds" would produce the ice crystals necessary in clouds for rain. They discovered that silver iodide, the material used generally in the $3,000,000 American rain-making industry, causes ice crystals to form at temperatures between three and five degrees Centigrade below freezing, zero on the Centigrade scale.

Natural "seeds" or nuclei in the air, on the other hand, cause crystals at temperatures between 10 and 15 degrees Centigrade below freezing, or zero.

This information, the two scientists declared, permits certain conclusions to be drawn as to the probable effectiveness of artificial seeding in producing appreciable amounts of rain over and above that which nature produces.

In moderate climates, they pointed out, conditions for rain and snow are generally most favorable at cold fronts and warm fronts. The cloudiness in both these conditions, they said, extends to very high altitudes, where temperatures are almost always much colder than the upper limit they found for the effectiveness of natural "seeds." In both these conditions, they said, the clouds contain enough freezing nuclei to give heavy rain or snow.

In some few instances, the scientists said, clouds do not extend so high. If the cloud nevertheless reaches high enough to cool off its top to below freezing, or zero degrees Centigrade, and above minus 15 degrees Centigrade, then silver iodide "seeds" might be effective. These situations, they believed, are usually local and of short duration.

The account of their experiments appeared in the current issue of the JOURNAL OF METEOROLOGY (Oct.).

Science News Letter, November 24, 1951

MEDICINE

Dextran Tops in One Test

➤ DEXTRAN, A sugar chemical substitute for blood plasma in cases of shock, got a big hand at the meeting of the American College of Surgeons in San Francisco.

It rated first among four blood plasma substitutes in experiments at the Mayo Clinic and Foundation, Drs. Robert C. Knutson, Jesse L. Bollman, and John S. Lundy reported. The experiments were designed to test ability of these chemicals to restore blood volume after a measured, acute hemorrhage.

The other three chemicals, in descending order of effectiveness in these experiments, were: gelatin, acacia and periston, or polyvinylpyrrolidone, also known as PVP for short.

Dextran's effectiveness in fighting shock in 20 patients who had been wounded or were suffering from intestinal strangulation was reported by Drs. B. W. Haynes, Jr., and Michael E. De Bakey of Baylor University College of Medicine, Houston, Tex.

The chemical, they found, was effective for early resuscitation of patients with wound shock. Depending on the kind of wound, the surgery needed to repair it and the amount of blood lost, dextran may give enough support to the circulation to enable the surgeon to repair the wound without giving whole blood. Or it may reduce to a minimum the amount of whole blood needed to carry the patient through the operation.

Anemia may result from use of dextran for patients with wound shock. But a distinct advantage achieved by the use of dextran is that whole blood transfusion does not have to be given immediately in an emergency but can be given later.

Patients with extensive injuries and severe blood loss cannot be resuscitated with dextran alone, the Houston surgeons emphasized. Whole blood will be needed in such cases.

Science News Letter, November 24, 1951

● RADIO

Saturday, Dec. 8, 1951, 3:15-3:30 p. m. EST

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Gen. George C. Kenney, president of the Arthritis and Rheumatism Foundation, and Dr. Darrell C. Crain, president of the District of Columbia chapter of the Arthritis and Rheumatism Foundation, will discuss "The Fight Against Arthritis."

MEDICINE

Cobalt 60 "Bomb" for Treating Cancer Patients

➤ A COBALT 60 "bomb" which promises life-saving treatment for more cancer patients was officially installed in the clinic of the Ontario Cancer Foundation, London, Ont.

The cobalt bomb is a small portion of radioactive cobalt 60 enclosed in a heavy lead case. Rays from the bomb can be directed to the cancer in a patient's body, much as X-rays are directed now in cancer treatment. But the bomb rays can penetrate deeply within the patient's body, without harming normal tissue on the way, in a manner that only a few super-voltage X-ray machines can do. And the bomb can deliver this penetrating, cancer-killing dose of rays at much less cost than the same dosage of X-rays or radium.

Radium to produce an equivalent amount of radiation would cost about $50,000,000, while the price of the cobalt 60 bomb is only about $50,000.

The cobalt for the bomb is made radioactive in the Canadian National Research Council's atomic pile at Chalk River, Ont.

The cobalt 60 bomb installed at London, Ont., is only the first of several similar units being produced for hospitals and cancer clinics in Canada and the United States.

Science News Letter, November 24, 1951

Yosemite Field School

A Workshop in Interpretive Methods

Twenty selected college graduates will have the opportunity to spend the summer in Yosemite National Park under the tutelage of the National Park Service Naturalist Division. They will receive intensive, varied training in the presentation of natural and human history to the public, and in the techniques of interpretation—on nature walks, with children, at campfires. Also considered will be related matter such as museum methods and the use of museum and library materials. Twelve days will be spent in the High Sierra, an opportunity for maturing, exhilarating personal experience. Students pay own expenses, plus modest incidental fee.

Application deadline, February 28.

For prospectus, address:

DIRECTOR, YOSEMITE FIELD SCHOOL
Box 545
Yosemite National Park, California

Books of the Week

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ANATOMY OF THE CHORDATES—Charles K. Weichert—*McGraw*, 921 p., illus., $8.00. A college text with emphasis on familiar, living species.

ANNUAL STATISTICAL REPORT: A Compilation of Traffic Accident and Related Miscellaneous Data for 1950 and Prior Years—*Dept. of California Highway Patrol*, 125 p., paper, free upon request to Clifford E. Peterson, Commissioner, Calif. Highway Patrol, P.O. Box 898, Sacramento, Calif. These 64 tables present basic information useful for further research.

THE ANTHROPOLOGY OF IRAQ: Part II, Number 1, The Northern Jazira—Henry Field—*Peabody Museum*, 196 p., illus., paper, $6.50. 63 plates and 195 tables accompany the technical text describing people in a troubled part of the world that we need to know about these days.

BAUGHMAN'S AVIATION DICTIONARY AND REFERENCE GUIDE—Ernest J. Gentle and Charles Edward Chapel, Eds.—*Aero Publishers, Inc.*, 3rd ed., 653 p., illus., $7.50. Some 2,000 new definitions cover atomic energy, guided missiles, radar, and other subjects that have become important to the industry only in the last few years; the reference guide includes mathematical tools and information on all aspects of the aircraft industry.

BRITISH SCIENTISTS—E. J. Holmyard—*Philosophical Library*, 88 p., illus., $2.75. Portraits and brief accounts of the lives and contributions of famous scientists from Roger Bacon to William Ramsey are followed by mention of current scientific progress in Britain.

CHAMORROS AND CAROLINIANS OF SAIPAN: Personality Studies—Alice Joseph and Veronica F. Murray—*Harvard University Press*, 381 p., illus., $5.00. After psychological study of these natives now under our protection, the authors warn that the future may find us with islands on our hands whose heavily increased population will have adequate physical health but emotional maladjustment.

FISH COOKERY—Linnea C. Dennett and Gladys S. Stillman—*University of Wisconsin Extension Service*, 12 p., illus., paper, five cents. The housewife is offered some pointers on how to select fish and some basic recipes for seafood dishes and sauces.

FOOD AND FEED RESERVES—Murray R. Benedict—*National Planning Association*, 47 p., paper, 50 cents. An Agriculture Committee report urging a new flexible policy for storage of food and feeds keyed to foreseeable needs of this country and strategic aid abroad rather than to support of farm prices.

GREEN SEED-BEDS: Towards a More Natural Basis for Agriculture—Morris J. Spivack—*Spivack*, 10th ed., 12 p., illus., paper, 50 cents. Urging use of plants rather than cultivation to crowd out weeds.

A HANDBOOK OF PSYCHOSOMATIC MEDICINE: With Particular Reference to Intestinal Disorders—Alfred J. Cantor—*Julian*, 302 p., $5.00. For the general practitioner as well as the specialist.

HOW CHILDREN LEARN TO THINK—Paul E. Blackwood—*Govt. Printing Office*, Office of Education Bulletin No. 10, 19 p., illus., paper, 15 cents. Most children, the author observes, are inclined to think when they are given an opportunity. Suggestions on how to teach them to think carefully.

HOW WISCONSIN FARMERS CAN FIGHT BRUCELLOSIS—*University of Wisconsin Extension Service*, 8 p., paper, two cents.

INDUSTRIAL USES OF RADIOACTIVE FISSION PRODUCTS: A Report to the United States Atomic Energy Commission—SRI Project No. 361—*Stanford Research Institute*, 87 p., illus., paper, $1.50. Development of this market will be delayed a few years while solutions are worked out to the many technical and economic problems known to exist, the authors conclude.

INTERLINGUA: A Grammar of the International Language—Alexander Gode and Hugh E. Blair—*Storm*, 118 p., $3.50. Presented in the hope that an increasing number of people all over the world will learn to communicate with each other by means of a common international language.

LOAD CARRYING CAPACITY OF ROADS AS AFFECTED BY FROST ACTION—*Highway Research Board*, Bulletin No. 40, 38 p., paper, 75 cents. Describing test procedure and equipment and showing clearly that all kinds of soil are weakened by freezing and thawing.

THE MAMMALS OF FULTON COUNTY, ILLINOIS—Elsie P. Anderson—*Chicago Academy of Sciences*, Bulletin, Vol. 9, No. 9, 35 p., illus., 75 cents.

MEXICAN BIRDS: First Impressions Based Upon an Ornithological Expedition to Tamaulipas, Nuevo Leon, and Coahuila, With an Appendix Briefly Describing All Mexican Birds—George Miksch Sutton—*University of Oklahoma Press*, 282 p., illus., $10.00. The author's drawings and water-colors illustrate this pleasant narrative and "roughly phylogenetic resume."

THE SEARCH FOR NATIONAL SECURITY—Benjamin H. Williams, Ed., *American Academy of Political and Social Science*, 259 p., paper, $2.00. This November issue of the Annals is in two parts, one on The Battle for Foreign Support and the other on Creating the Economic Basis of National Strength.

75TH ANNIVERSARY PROCEEDINGS—*Connecticut Agricultural Experiment Station*, 72 p., illus., paper, free upon request to publisher, New Haven, Conn. These papers given at the anniversary celebration in September, 1950, include an article on Science in a Democracy and a symposium by leading scientists on The Research Institute in Modern Society.

A STAMP COLLECTOR'S ENCYCLOPAEDIA—R. J. Sutton—*Philosophical Library*, 263 p., illus., $3.75. Over 3,000 definitions, interpretations, and other references important to stamp collectors are followed by a short glossary of foreign words.

STEPPING STONES ACROSS THE PACIFIC—Alfred M. Bailey and Robert J. Niedrach—*Denver Museum of Natural History*, Museum Pictorial No. 3, 63 p., illus., paper, 56 cents. Photographs and narrative tell the story of field work on Oahu, Midway, and Wake Islands during the Museum's Mid-Pacific Expedition in the spring of 1949.

TV AND ELECTRONICS AS A CAREER—Ira Kamen and Richard H. Dorf—*Rider*, 326 p., illus., $4.95. How to get started on work in this new field, from broadcasting to servicing. Contributions by three specialists are included.

TOWARD A GENERAL THEORY OF ACTION—Talcott Parsons and Edward A. Shils, Eds.—*Harvard University Press*, 506 p., $7.50. Nine noted social scientists here present the outcome of a collaborative attempt, begun in 1948, to clarify and systematize contemporary theories of personality, social systems and culture.

TUBERCULOSIS OF FARM ANIMALS—Department of Veterinary Science—*University of Wisconsin Extension Service*, 4 p., paper, two cents. Although progress in controlling this disease has been notable, this leaflet urges continued vigilance, since one diseased animal can under certain conditions spread the disease throughout the community.

VEGETABLE GARDENERS' HANDBOOK ON INSECTS AND DISEASES—W. H. White and S. P. Doolittle—*Govt. Printing Office*, USDA Miscellaneous Publication No. 605, 30 p., illus., paper, 20 cents. This revision of the Victory Gardener's Handbook helps the gardener identify and control the more common pests and gives formulas and directions for preparing insecticides and fungicides.

WILDLIFE IN COLOR—Roger Tory Peterson—*Houghton, Mifflin*, 191 p., illus., $3.00. A beautiful introduction to the prodigal variety of American wildlife, arranged by type of environment.

WISCONSIN NEEDS BETTER PASTURES—F. V. Burcalow, O. E. Hays, and H. L. Ahlgren—*University of Wisconsin Extension Service*, 16 p., illus., paper, five cents. Bluegrass pastures renovated with legumes produced twice as much over a five-year period as those left untreated.

Livestock producers lose more each year from parasites than they do from infectious diseases.

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⚙ *BUILDING BLOCKS for the youngster, recently patented, resemble the ordinary toy blocks widely used but each is hollow and within them are magnets so arranged that they hold two blocks together or drive them apart. Permanent bar magnets are used to provide attraction or repulsion.*

Science News Letter, November 24, 1951

⚙ *FLUORESCENT SIGN lamp has its sign message contained within the glass tube which is filled with an invisible gas and in which the electrical discharge takes place. The letters fluoresce when excited by the electrical energy. Any number of colors can be combined in one design.*

Science News Letter, November 24, 1951

⚙ *APRONS FOR afternoon entertaining, as well as others for kitchen wear, are made of vinylite plastic material and come in a variety of patterns and colors. In styling, they range from permanently-pleated half aprons to invisibly-boned bib aprons, and all are resistant to moisture, fading and flame.*

Science News Letter, November 24, 1951

⚙ *INK REMOVER, a recently patented device to take ink out of a fountain pen before refilling, has a horizontal arm on the top of a shaft which can be rotated at high speed. Ink in the pen is driven out by centrifugal force when the pen, pointed outward, is rapidly rotated on the arm.*

Science News Letter, November 24, 1951

⚙ *SUPER-FAST DRILL, shown in the photograph, for boring holes in plastics has a straight, round shaft of smaller size than the spiral-grooved shaft found in conventional drills, thus reducing heat from friction. Two tiny notches in the drill tip split chips into smaller pieces which allows a less impeded chip flow.*

Science News Letter, November 24, 1951

⚙ *SIX-COLOR PENCIL has a simple rotary control to select, feed, expel and retract each of the six colors. The individual color indicator for each lead is visible and there is also an indicator to reveal the amount of lead of each color remaining.*

Science News Letter, November 24, 1951

⚙ *GIANT DRILL, four feet in diameter and 200 feet long, is used to bore a horizontal hole in flat-lying coal seams and bring the coal out in a continuous stream. Six of these engine-driven augers operated in parallel can dig out up to 700 tons of coal an hour.*

Science News Letter, November 24, 1951

⚙ *HEATING TAPE, to wrap around laboratory glassware of standard or odd shapes and deliver heat to the contents, is made of resistance wire covered with a double insulating sheath of braided glass fiber yarn. It comes with lead wires for direct connection to 110-volt current.*

Science News Letter, November 24, 1951

Do You Know?

In making a ton of *coal* into coke, about eight gallons of tar are produced.

Dry rot in *lumber* is not really dry because some moisture is required for the growth of the fungus that causes rot.

During the 1950 *hunting* season in the United States, a total of 852 persons were accidentally shot, 173 of whom were killed.

Porous asphalt is under trial in one American city for surfacing street pedestrian areas with the idea that it will permit enough water to get into the soil to meet the needs of trees.

Brazil is a major source of industrial *diamonds.*

The home of the *quince,* once a popular fruit in America, is the Near East.

BIOPHYSICS

Eye Cells Color Sensitive

➤ BY LISTENING to the electrical signals picked up from individual cells of the eye's retina of cats and other animals, a scientist found that the visual cells are sensitive in a different way to different colors. Each one sends to the optic nerve and the brain a report of a relatively narrow band of the color spectrum.

This discovery was made by Prof. Ragnar Granit, director of the Nobel Institute for Neurophysiology, Stockholm, Sweden. He reported it to an audience of scientists at the National Academy of Sciences in Washington.

The nerve cells studied, known to neurologists as the third neuron ganglion cells, respond to both light and dark or to increase and decrease of illumination. The electric impulses resulting can be translated into light which writes its own record on photographic film, or it may be changed into sound and listened to over a loudspeaker. Some neurons are more sensitive to light than to its absence and give off a greater proportion of "on" than "off" responses. The proportion of on's to off's over the whole receptor field varies with increase of intensity of light as well as with change of wavelength of the stimulating light wavelength.

The various nerve cells scattered through the retina are each sensitive to all or most of the rainbow colors, Prof. Granit found, But some are more sensitive to one color than to others.

By fatiguing the eye with light of a single color, say red, and then measuring the sensitivity of the various nerve cells, Prof. Granit was able to sort out those which were red-tired and those whose sensitivity was not affected so much.

Prof. Granit's work on the cat's eye was supplemented by study of the color sensitivity of other animals, including rats, guinea pigs, snakes, frogs and tortoises. These animals are more sensitive to some colors than to others. In general, the color sensitivities seem to cluster around three bands in the red, green and blue regions of the spectrum. There are also cells which do not show specific color sensitivity but record from the whole visible spectrum as if their activity represented all the specific color sensitivities combined.

The presence in the eye of at least three photochemical substances would be necessary to account for his results, Prof. Granit believes.

Science News Letter, November 24, 1951

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